NASA KENNEDY SPACE CENTER

REQUEST FOR INFORMATION (RFI)

Liquid Oxygen Vaporizer

asdennis

4/11/2011

REQUEST FOR INFORMATION (RFI) FOR LIQUID OXYGEN (LO2) VAPORIZER

Introduction

National Aeronautics and Space Administration (NASA) invites potential offerors to submit a response to this Request for Information (RFI) to find interested and qualified sources and obtain planning information for the design, manufacture, and acceptance testing of a replacement LO2 vaporizer. This RFI does not apply to installation and interconnecting piping for the vaporizer at the procuring agency's site. This vaporizer will be utilized by future NASA space launch programs using Space Launch Complex 39B at Kennedy Space Center (KSC).

It is envisioned that this potential acquisition may ultimately result in the award of a competitively awarded best value contract. The Government will provide in its Request for Proposal a technical performance specification. The intent of this RFI is to obtain information from industry to assist KSC in its acquisition development. NASA is soliciting initial intent of interest from all companies with past experience and qualifications directly related to this type of design, fabrication, and testing, and who can meet the anticipated delivery timelines noted in this RFI. NASA reserves the right to share all information received in response to this RFI throughout NASA and to use all information submitted in response to this RFI in NASA's formulation of a solicitation seeking competitive proposals. However, any submitted competition sensitive data should be clearly marked and will not be shared outside of NASA vaporizer development team members. Although information contained herein represents current program content and acquisition planning, it is subject to change. Response to this RFI is requested within the context of the general approach described in the following paragraphs.

LO2 Vaporizer Overall Description

The vaporizer will be installed above ground using atmospheric air (natural draft) to provide heat of vaporization and sensible heat to LO2. The LO2 vaporizer system will receive LO2 from a 900,000-gallon storage sphere, vaporize the LO2, and return Gaseous Oxygen (GO2) to the ullage space to pressurize the LO2 storage sphere. The increased LO2 storage sphere ullage pressure is required to provide adequate Net Positive Suction Head (NPSH) to LO2 pumps supplied from the LO2 storage sphere. The performance characteristics provided below are based on the performance of the current vaporizer and in part on the system-level requirement for a GO2 flow rate sufficient to pressurize a 55500 cubic foot ullage space at a rate of 1 psig per minute.

The vaporizer system shall be comprised of multiple vaporizer modules connected by facility piping and valves. Installation and facility piping and valves are not a part of this RFI.

The vaporizer modules shall be designed and fabricated in accordance with ASME B31.3 for Normal Fluid Service, Severe Cyclic Conditions.

The vaporizer modules shall be natural draft type requiring no external power or other utilities. The vendor is encouraged to propose a forced convection vaporizer (including associated fan) as a separate option with cost, size, and electrical power compared with the baseline natural draft type system if there is a significant impact.

There are two cases that bound the total vaporizer flow rate, associated vaporizer inlet pressure, and maximum allowable vaporizer pressure drop as provided below. The vaporizer system (all modules combined) shall meet both cases of:

Case 1: Minimum Tank Liquid Level

Provide mass flow rate of 4.5 lbs/sec or 191972 scfh with:

11.0 psig vaporizer inlet pressure (under flow)
8.7 psi maximum vaporizer pressure drop including liquid head above inlet

Case 2: Maximum Tank Liquid Level

Provide mass flow rate of 7.4 lbs/sec or 315688 scfh with:

27.0 psig vaporizer inlet pressure (under flow)
21.0 psi maximum vaporizer pressure drop including liquid head above inlet

The unit(s) shall perform the above flow and pressure requirements with an outlet approach temperature of not more than 30°F to the ambient air temperature range of 19°F to 99°F. Approach temperature is the difference between ambient temperature and outlet gas temperature.

The vaporizer system shall be capable of providing specified performance characteristics over a period of up to 10 hours continuously.

The vaporizer module inlet/outlet interface location and horizontal dimension targets are shown in Figure 1. Target vaporizer height from mounting surface is 10 ft or less.

Vendor shall advise of approximate number of parallel vaporizer units based on their standard designs needed to meet above requirements.

The vaporizer piping shall have a design pressure (MAWP) of not less than 55 psig.

The vaporizer piping shall have a design temperature range of –320 degrees F to +158 degrees F.

The vaporizer supporting aluminum structure shall be designed to meet the requirements of the Aluminum Design Manual of The Aluminum Association.

Design calculation for the vaporizer modules' support structure, sealed and stamped by a State of Florida licensed engineer (or equivalent) shall be submitted for approval to the procuring agency prior to fabrication of the vaporizers.

The vaporizers will be located approximately 3000 feet from the Atlantic Ocean. Additionally the vaporizers will be subjected to deposition of the combustion products of solid rocket motors that are also high in chlorides. Mitigation of maintenance problems resulting from the corrosive effects of this environment shall be of the greatest concern. Therefore, all structural elements and fins shall be constructed from 6000 series aluminum. All piping, fittings and components exposed to LO2/GO2 flow shall be 316L Stainless Steel. Design shall include galvanic corrosion mitigation. Tube array shall be constructed with press fit extruded aluminum longitudinal fins.

All welds on pressure containing parts must be 100% NDE volumetric inspected.

Vaporizer shall have a structural frame with legs allowing module to be free standing and suitable for fastening to concrete pad or skid. Vaporizer frame shall also have permanent lifting lugs to facilitate lifting/lowering each module.

REQUEST FOR INFORMATION (RFI) FOR LIQUID OXYGEN (LO2) VAPORIZER

Following fabrication each vaporizer module shall successfully complete acceptance testing prior to submit for final clean to commercial LO2 cleaning standards (CGA G-4.1: Cleaning Equipment for Oxygen Service). Acceptance testing shall include a pressure-leak test, a LN2 cold shock test and dimensional verification.

Vendor Qualifications

The vendor will be required to submit certified documentation demonstrating their company's core competencies (skill, knowledge, expertise, facilities, test equipment, and documentation systems) and history for design, fabrication, ASME code test, and qualification testing of press fit extruded / aluminum finned over stainless steel tube vaporizers similar to those as described in above description. The vendor shall comply with the required design processes, which includes a kickoff meeting and two design reviews. The vendor shall deliver all documentation during the design (including shop fabrication drawings, strength, thermal and performance flow analyses, and materials list) for NASA approval.

SPECIFIC INFORMATION SOLICITED

Responders to this RFI are encouraged to comment on any of the foregoing and to express their interest in this proposed acquisition by submitting the following information:

1. Organization name, address, describe principal activity, primary point of contact and business size.

2. Cost – Rough Order of Magnitude (ROM) for design, fabrication and acceptance test, cleaning and shipment to NASA-KSC. Separately, provide ROM cost for an additional (second) set of identical vaporizers.

3. Lead Times – Describe typical lead times required for design, fabrication and acceptance test.

4. Experience – Describe your experience in developing and producing vaporizes for ground system cryogenic aerospace and space vehicle /or cryogenic processing plants in coastal environment, similar to those as described in this RFI. Please state "past performance" and verifiable references to past projects.

5. Please advise if this requirement is considered to be commercial or commercial-type product. Commercial item is defined in FAR 2.101.

RESPONSE INSTRUCTIONS

The requested responses are for information and planning purposes only. Vendors interested shall include past experience information in their response to NASA. NASA does not intend to post information or questions received to any website or public access location. NASA does not plan to respond to the individual responses. Feedback to this RFI may be utilized in formulating the Government's acquisition strategy and documents.

All responses should be provided electronically in MS Word format. Font should be Times New Roman, size 12. Responses should not exceed 15 pages and should reference "NNK11RFIAD01". Please submit responses electronically no later than May. 2, 2011, to Andrew.S.Dennis@nasa.gov. Oral communication is unacceptable. All technical questions may be submitted within the response.

This preliminary information is being made available for planning purposes only, subject to FAR Clause 52.215-3, entitled "Solicitation for Information and Planning Purposes". It does not constitute a Request for Proposal, Invitation for Bid, or Request for Quotation, and it is not to be construed as a commitment by the

Government to enter into a contract. Moreover, the Government will not pay for the information submitted in response to this RFI, nor will the Government reimburse an Offeror for costs incurred to prepare responses to this RFI.

No solicitation exists at this time; therefore, do not request a copy of the solicitation. If a solicitation is released it will be synopsized in the FedBizOpps and on the NASA Acquisition Internet Services (NAIS). It is the potential offeror's responsibility to monitor these sites for the release of any solicitation or synopsis.

An ombudsman has been appointed -- See NASA Specific Note "B".

The solicitation and any documents related to this procurement will be available over the Internet. These documents will reside on a World Wide Web (WWW) server, which may be accessed using a WWW browser application. The Internet site, or URL, for the NASA/KSC Business Opportunities home page is http://prod.nais.nasa.gov/cgi-bin/eps/bizops.cgi?gr=D&pin=76. It is the offeror's responsibility to monitor the Internet site for the release of the solicitation and amendments (if any). Potential offerors will be responsible for downloading their own copy of the solicitation and amendments, if any.

Any referenced notes may be viewed at the following URLs linked below.

REQUEST FOR INFORMATION (RFI)
FOR LIQUID OXYGEN (LO2) VAPORIZER

Note:
1) Horizontal dimensions are targets for reference only.
2) Vertical vaporizer shown for illustration only; horizontal vaporizer may be proposed with justification

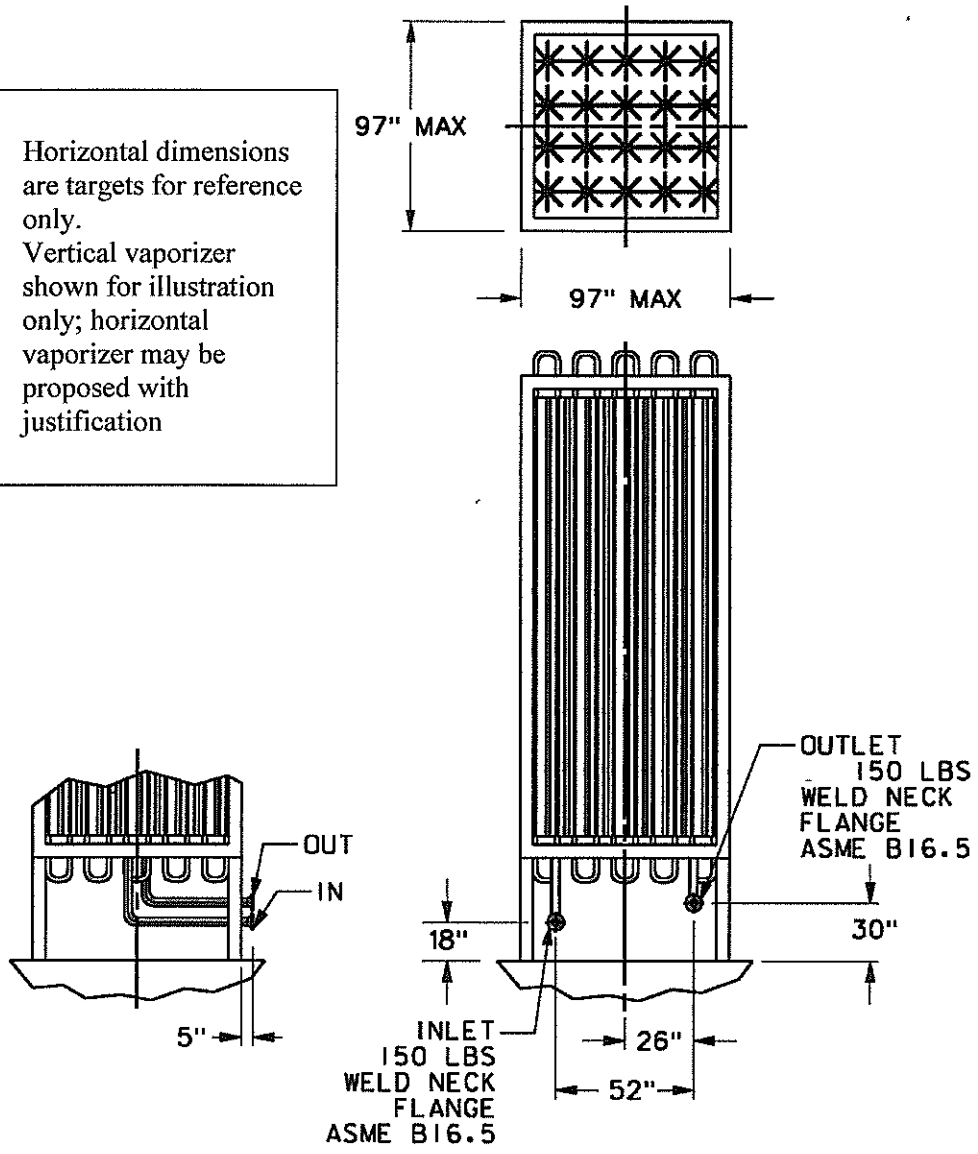

Figure 1 – Vaporizer Conceptual Envelope Dimensions